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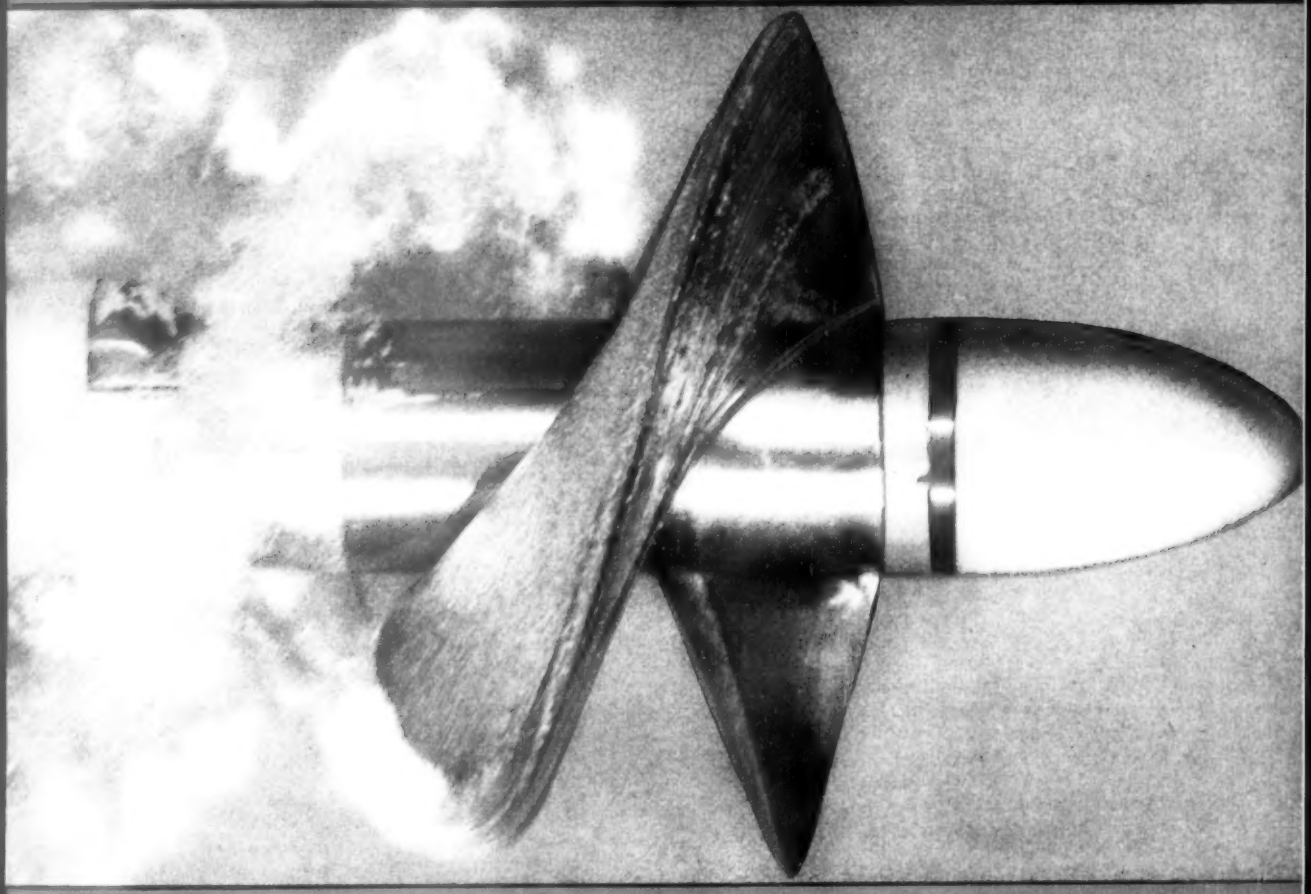
September 13, 1958

VOL. 74 NO. 11 PAGES 161-176

SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE



Ship's Super Prop

See page 169

A SCIENCE SERVICE PUBLICATION

Kodak reports on:

finding out whose lubricant is spattering . . . a ceramic magnet, a coil, a capacitor, a germanium diode, and some nylon bearings . . . color movie film that duplicates better

A venture in soap

Picture a large plant where each day they manufacture 10^n miles of a certain critical material, 42 inches wide. Cleanliness is the watchword, of course. On an average of once in five years, however, a piece of the product is found in the course of its final inspection to have a small spot on it. There is some value in fixing the guilt, even though merciful disposition of the matter by simply slitting the throat of the superintendent of the offending division is considered poor industrial relations.

The little spot probably originated as a tiny particle of lubricant from somebody's machinery. Whose?

Thanks to an idea from the teeming brain of a young man whose father-in-law always knew he'd make good, the question can be answered. Each division's lubricants are tagged with a little characteristic soap in which the metallic element is a scarce and heavy one. When the spot alarm sounds, a quick excision is made and the mass spectrometer fingers the suspect.

We make the exotic soaps. A typical one is 2-ethylhexanoic acid indium salt. The light, branched-chain acid radical permits blending into almost any commercial lubricating oil or grease, with little effect on lubricating qualities at the level of 0.25%. We could make such soaps for anybody, from any element on the left side of the periodic table and from any reasonable acid he wants, including stearic.

This would be on the basis of our custom synthesis service, not as listed compounds like the other 3700-or-so Eastman Organic Chemicals. Let's keep it that way until a system of trace-coding for lubricants gets covered by international convention.

This isn't our first venture into soap. We can remember back to when we ground sodium ricinoleate by hand for the toothpaste trade. You can find out more about the custom service or get a copy of "Eastman Organic Chemicals List No. 41" by writing Distillation Products Industries, Eastman Organic Chemicals Department, Rochester 3, N. Y. (Division of Eastman Kodak Company).

4 twirls for 1/5 joule

Here is a new Kodak device, obtainable for only $13.95 (list). It converts a twirl of your fingers into a half-million-erg jolt of d-c energy, four twirls for 200 watt-milliseconds. With a thousand ohms of load resistance, 63% of the four twirls-worth of energy is discharged within 150 milliseconds, in a surge that starts at 50 volts. The energy can be taken off from the socket in the hinged cover. To trip, you close circuit between the projecting screw at the left and the lower stud, first having wedged the knurled nut firmly to the left in its slot.

Don't complain that the device could be designed for better mechanical convenience. We are merely trying to be helpful. For commercial practicability, we have had to design the *Kodak Generator Flasholder* to the convenience of those who want to snap it onto a camera—almost any camera—for photoflash pictures that will never miss synchronization because of aged batteries.

For your part, you ought to be willing to put in a few minutes of junkbox-inspired inventiveness in adapting the gimmick to your own high scientific purpose. There is no need to write, wire, or phone. Just march down to the nearest camera counter.

A green look

We used to make a 16mm product designated Kodachrome Commercial Film. If you loaded it into a camera, exposed it according to directions, had it properly processed, and projected it, the result would look bad. The colors would be weak and washed out. The film wasn't intended for projection. It was intended only to serve as an original from which numerous copies could be reproduced. The copies were excellent, much better than duplicates from the more familiar *Kodachrome Film*. Obviously, every movie studio had to have some of this, but who else?

Strange as it may seem to those who ignore certain long-range trends in the way man earns his daily bread, Kodachrome Commercial Film found many hundreds of customers.

Now we have something better for the same purpose. We have the new *Ektachrome Commercial Film, Type 7255*. It looks green in projection instead of just washed out.

Theory requires each of the three layers of the film to emerge from processing with its originally unexposed areas in a color complementary to the color to which that layer responds. Only theoretical dyes do this perfectly. Real dyes that can be formed *in situ* by combination of coupler compounds in the emulsion with the reaction products of the development process don't quite make it. It is possible, however, by fudging a little in the selection of all three dyes to play the errors off against each other and wind up convincing the color receptors in the human eye that nature is being simulated.

But the color receptors in a second piece of film are not the same as the color receptors in the eye. What convinces one does not convince the other. The film needs a little sharper gradient of response to red light than the eye needs. Thus it works out that what looks right to the film on which you are copying looks green to the eye.

What's the advantage of Type 7255 *over Kodachrome Commercial? Improved speed, graininess, sharpness, latitude, and quality in the release prints. Who cares? Not just studios but movie technicians who learn such things from Eastman Kodak Company, Motion Picture Film Division, Rochester 4, N. Y., and work for organizations that understand how lucidly a 16mm projector can report on work in progress. Some R&D contracts even carry clauses specifying this form of lucidity.*

Price stated includes Federal Tax and is subject to change without notice.

Kodak

This is another advertisement where Eastman Kodak Company probes at random for mutual interests and occasionally a little revenue from those whose work has something to do with science

PSYCHOLOGY

Study Mother Love

Physical contact, warmth, tenderness and patience seem to be more important influences on an infant's love for its mother than is the food she gives.

➤ THE LOVE of a tiny baby for the mother to whom he clings is based more on the comfort of contact than on the fact that the mother gives him food.

The baby has a need for the comfort of affectionate contact with a mother or mother substitute, Dr. Harry F. Harlow of the University of Wisconsin told the American Psychological Association meeting in Washington, in his presidential address.

That contact comfort is of overwhelming importance in developing the baby's affection, while the giving of milk is of negligible importance, is shown by experiments conducted with tiny baby monkeys.

The macaque infant, Dr. Harlow explained, differs from the human baby in that the monkey is more mature at birth and grows more rapidly, but the basic responses relating to affection, including nursing, contact, clinging, and even visual and auditory exploration, are not fundamentally different in the two animals.

Dr. Harlow built a mother surrogate or substitute for his monkey experiments on infant love. It was made from a block of wood, covered with sponge rubber and sheathed in tan cotton terry cloth. A light bulb behind it radiated heat.

"The result," said Dr. Harlow, "was a mother soft, warm and tender, a mother with infinite patience, a mother available 24 hours a day, a mother that never scolded its infant and never struck or bit its baby in anger."

Then he built another surrogate mother with less capability for contact comfort. This second "mother" was made of wire screen. This "mother" was adequate to support the baby and it was warmed by radiant heat. But it was not cuddly.

Even when it was arranged for the wire mother to give the baby milk while the cuddly mother did not, the baby monkey spent more time with the cuddly mother. And as the baby monkeys grew older they were more and more responsive to the nonlactating cloth mother and paid less and less attention to the wire mother.

This finding is contrary to the interpretation that a baby's love for mother is dependent upon her satisfying his hunger and thirst, Dr. Harlow concluded.

In fact, he said, the American father is physically endowed with all the really essential equipment to compete with the American mother in one essential activity, the rearing of infants.

Brain Operation Damage

➤ A FOLLOW-UP test of mental patients who had undergone the operation of topectomy for removal of tissue from specific circumscribed areas of the brain eight years before was reported to the Psychological Association.

Marked loss was shown on eight out of the 14 psychological measures used, Drs. Aaron Smith and Elaine F. Kinder of Rockland State Hospital, New York, reported.

This finding is in contrast to conclusions arrived at four months after the operation that no "permanent" loss in intellectual function resulted from the operation.

Only a single group of patients failed to show intellectual loss on successive tests after the operation. These were younger persons who had had a portion of the lower part of the forebrain removed.

The exact site of the operation was found to be important to the amount of intellectual impairment resulting, the report indicated. While topectomies in both upper and lower parts of the forebrain result in losses, the younger patients with operations on the lower areeas were the least affected.

For this reason the scientists said, it is improper to lump brain operations together under such classifications as "frontal lobe cases." The findings do not, however, imply localization of function in the brain, but do indicate that the destruction of the same amount of tissue to two different sites of the forebrain produce different effects eight years later.

The findings are in harmony with independent findings of increasing neurological degeneration after the topectomy, the scientists reported.

Scientists Approved

➤ THE SCIENTIST is looked on by the public as a pretty good fellow.

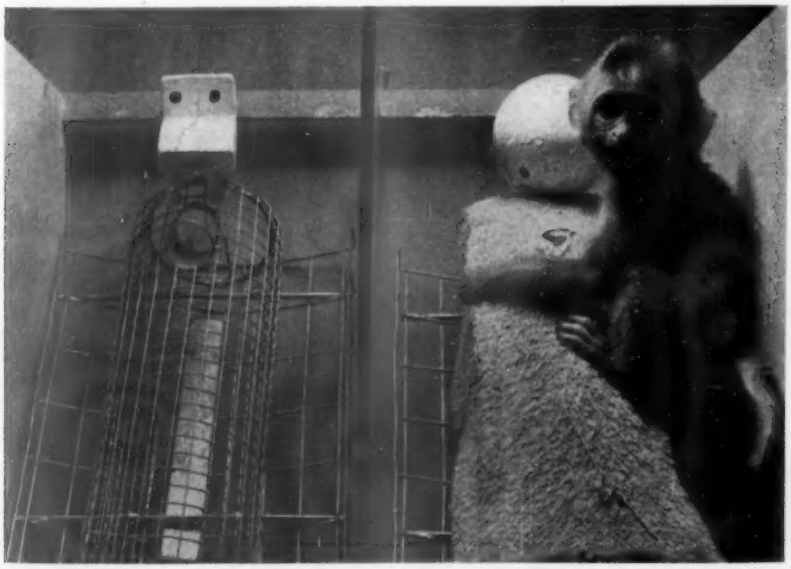
This is shown by a nationwide survey of a sample of 1,919 adults in the United States. The survey was conducted by the survey research center of the University of Michigan, sponsored by the National Association of Science Writers and supported by the Rockefeller Foundation. Results of the survey were reported to the Psychological Association by Dr. Robert C. Davis of the survey research center.

When asked to describe the scientist, many persons (37%) called him intelligent and the next most frequent description mentioned his education. Only 3% mentioned mild eccentricity and 4% stressed his "overdedication to work." Ideological peculiarities were hardly mentioned at all.

A total of 83% said without qualification, that they believe that the world is better off because of science. Only 2% believe it is worse off.

Most persons, (53%) feel that possible conflict with religion should not inhibit science, Dr. Davis reported.

And most persons, (54%) feel that scientists should be free to work on nonpractical research.



MONKEY AND MOTHERS—An infant macaque monkey clings to one mother substitute, a soft, cuddly one, while a second "mother" made of wire screen appears at the left. Even when it gave the infant milk, the wire mother was less acceptable to the baby.

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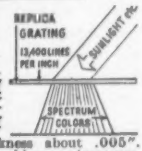

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BIOLOGY

RNA Influences Cell Differentiation

➤ RIBONUCLEIC ACID has been pinpointed as having an essential role in cell differentiation, the process by which the early embryo's look-alike cells become nerve, bone, skin and other organs.

Working with extremely small quantities of cellular material, 20 to 50 cells, taken from embryonic newt and salamander tissue, Dr. M. C. Niu of the Rockefeller Institute for Medical Research, New York, found that the presence of ribonucleic acid is critical for the formation of specialized tissues. He used cells removed from two-to-five-day-old fertilized eggs that under ordinary circumstances would become epithelial or skin tissue. These cells, Dr. Niu told SCIENCE SERVICE, have the unique characteristic of multi-potentiality: theoretically they could become nerve, bone or kidney cells.

This is believed to be the first practical demonstration of the cells' multi-potentiality.

By growing the cells in a hanging drop of saline solution that included a 97% pure extract of nucleic acid and protein taken from cow tissue, Dr. Niu was able to control cell differentiation. If the ribonucleic acid had been obtained from the kidney then the original unspecialized cells would develop into tubules when they were transplanted into living embryonic tissue. If the thymus gland had been the source for RNA, thymus-like cells would show up.

There is a very exact amount of ribonucleic acid necessary to control the cell differentiation activity, Dr. Niu found, either more or less will yield no results. Between 0.3 and 0.5 micrograms of RNA per hanging drop was found to be the optimum concentration.

There is direct relationship between the amount of RNA and the power of the cells to differentiate. With 40% of RNA removed, 12% of the differentiating activity of the tissue culture was lost.

Dr. Niu reported on his research to scientists attending a developmental biology symposium of the American Society of Zoologists meeting in Bloomington, Ind.

Science News Letter, September 13, 1958

MEDICINE

Vision Clouds as Cocktails "Make Life Rosy"

➤ THE BELIEF that a few cocktails will enable a drinker to "look at the world through rose-colored glasses" is inaccurate. The color is more likely to be grey.

A study of the effect of alcohol on vision and hearing revealed that alcohol had the same effect on vision as that of setting a grey glass in front of the eyes, or driving with sun glasses in twilight or darkness. Stronger light is needed for distinguishing objects and dimly lit objects may not be seen at all, Dr. Rollo N. Harger, professor of biochemistry and toxicology at the Indiana University School of Medicine, reports in the *Journal of the American Medical Association* (Aug. 30).

Furthermore, alcohol tends to cloud the ability to differentiate between tones.

The difficulty arises because of the depressent effect of alcohol on the central nervous system. Most of the drug effects of alcohol are due to its presence in the brain, which it enters within seconds after it appears in the blood.

Small amounts of alcohol seem to cause a temporary rise in pulse rate, blood pressure, and total blood flow. In addition, the liver's ability to break down sugar becomes impaired. It appears unlikely, however, that the moderate use of alcohol produces any kidney damage.

Science News Letter, September 13, 1958

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PHYSICS

Foresee H-Power Soon

➤ A FULL-SCALE, power-producing plant harnessing the awesome fury of hydrogen bombs for peaceful purposes may be built within the next 10 or 20 years.

Only "ingenuity, hard work and a sprinkling of good luck" are needed to obtain controlled fusion power.

"Project Sherwood" is the name given to the U. S. program aimed at controlling thermonuclear reactions to produce power. The first detailed account of the program's successes and failures, a book-length report, is now available to the public as part of the U. S. participation in the Second United Nations International Conference on the Peaceful Uses of Atomic Energy.

The official fusion story has been likened to the famous Smyth Report of 1945, which outlined the development of the atomic bomb to the public for the first time. The controlled thermonuclear report is less technical because the methods are more difficult to describe without using mathematical equations.

Because of the enormity of the problems involved, progress in harnessing fusion reactions for power may be "slow and halting." There, however, is "no basic obstacle" yet uncovered to prevent attainment of the final goal, Dr. Amasa S. Bishop, who prepared the report for the Atomic Energy Commission, concludes.

Successful completion of the program, "one of the most important and challenging" ever undertaken, would yield a new and practical source of energy to meet man's energy needs for "as far into the future as he can see" since the deuterium fuel to be burned can be obtained in virtually unlimited supply from the world's oceans.

To control thermonuclear energy, the deuterium or deuterium-tritium fuel must be ionized and heated to a temperature of a hundred million degrees centrigrade or more and the resulting plasma confined at this temperature long enough to allow a substantial portion of the nuclei to fuse. The energy thus released must then be harnessed and converted to usable power.

Three basic methods, each with many variations, are being tested as ways of plasma confinement in the four main laboratories and other institutions conducting thermonuclear research. They are pinch-type, stellarator-type and magnetic mirror confinement. (See SNL, May 17, p. 307.)

Two other promising approaches are the molecular ion injection method and the Astron concept in which a circular sheath of high-energy electrons acts to confine and heat the plasma. (See SNL, Sept. 6, p. 151.)

In the seven years since Project Sherwood was initiated, plasma temperatures of a million degrees, more than 30 times higher than those reached previously, have been obtained.

One device, known as Scylla and built by the Los Alamos Scientific Laboratory, has yielded a rather intense burst of neutrons, the neutral particles found in atomic cores whose production is an important measure of fusion reactions. Although the exact origin of the neutrons has not been determined, there is as yet no disproof of their thermonuclear origin.

The scientific team at Los Alamos, under the direction of Dr. J. L. Tuck, is concentrating its efforts for the most part on the pinch approach, in which the plasma is pinched into a narrow stream away from the container walls due to its own magnetic field.

At Princeton University a staff of scientists and engineers, including some from industry, are building several models of a stellarator, the largest of which should achieve 100 million degree temperatures for experimental purposes. The stellarator approach, proposed by Dr. Lyman Spitzer Jr., director of Princeton University Observatory, consists of confining the plasma in an endless tube by means of an externally imposed axial magnetic field.

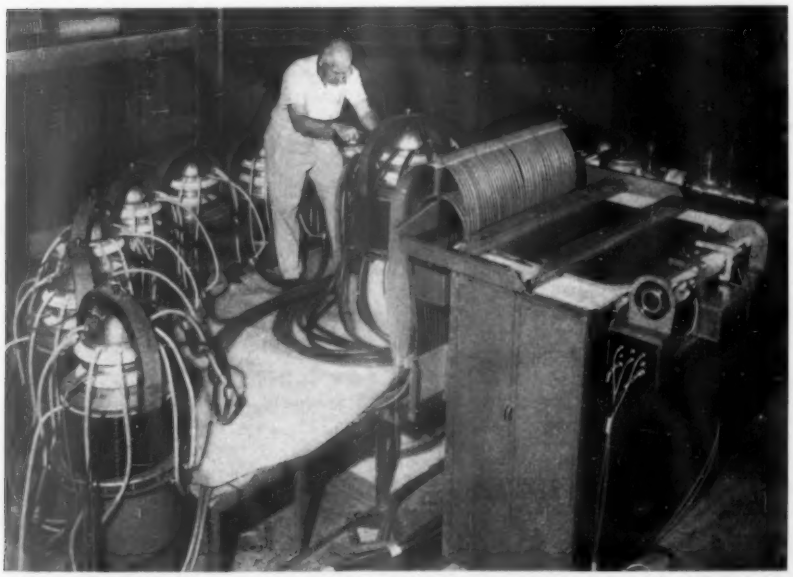
In the magnetic mirror approach, which is being tested along with others at the University of California's Radiation Laboratory in Berkeley and Livermore, plasma confinement is provided in a straight cylindrical tube by means of an externally imposed axial magnetic field with mirrors at the two ends.

In the molecular ion approach being investigated at Oak Ridge National Laboratory, deuterium ions are injected transversely into a static magnetic field and dissociated by a special carbon arc. This method of plasma ignition to very high temperatures, if successful, should also be useful for other approaches, such as the stellarator.

New York University, the Naval Research Laboratory and Massachusetts Institute of Technology are also investigating various aspects of controlled thermonuclear research. The over-all coordination and administration of the entire program is under the direction of Dr. A. E. Ruark of the Atomic Energy Commission.

At the Conference there has been talk of joint research efforts with other nations, especially Russia, now that the U. S. progress has been released from secrecy and displayed. Whether this will ever happen is for the future. It involves political policy which scientists do not decide.

Science News Letter, September 13, 1958



SCYLLA—Prof. William C. Elmore of Swarthmore College, a consultant to the Los Alamos Scientific Laboratory for the past year, makes final adjustments on the fusion device Scylla. The semicircular bank of capacitors is charged to 80 kilovolts and then discharged around the tube shown at the right of the photograph.

BACTERIOLOGY

New Bacterium Found, Resembles That of TB

➤ A TYPE of microorganism has been found, so closely resembling that of tuberculosis that it is mistaken for the real thing in treatment.

Called atypical mycobacterium, it was isolated from a group of children thought to be afflicted with scrofula, a tuberculosis of the lymph glands, and 25 adults being treated for tuberculosis of the lungs.

Drs. John Chapman and Ruth Guy, who isolated the bacterium at the Southwestern Medical School of the University of Texas, Dallas, said the microorganism resembles that of TB except it is more beaded, longer and fatter.

Other researchers have found other atypical mycobacteria during the past few years.

Science News Letter, September 13, 1958

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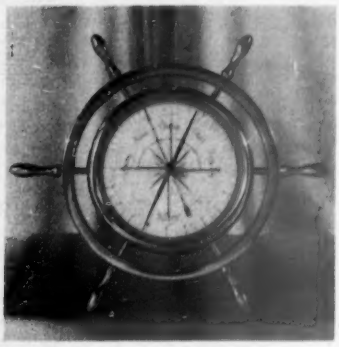

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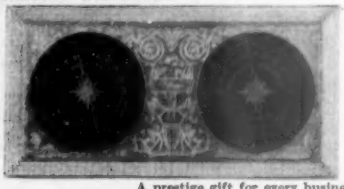

A prestige gift for every business man or woman—for desk, mantle, office or home. A work of art in design and craftsmanship. One dial shows relative humidity while other indicates Fahrenheit and Centigrade temperatures. Background is richly engraved with heraldic design—black on gold. Pearl finished faces are stamped in gold and feature carved-effect brass dials. Entire unit, measuring 3¾" x 7⅛", is encased in dimensional gilt pattern frame protected against dust and damage by heavy lucite cover. Musical instrument bridge type easel adds final distinctive touch.

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BIOLOGY

DNA Synthesized

➤ A SUBSTANCE that looks and acts like DNA, the material from which living genes are made, has been made.

The man-made DNA-like substance may have an important role in cancer treatment, scientists hope, because it interferes with the activity of natural DNA. Cancer cells are believed to have an altered or abnormal DNA, or deoxyribonucleic acid.

Their hopes are largely based on the finding that artificial DNA inhibits the natural substance's ability to cause heritable changes. Some kinds of pneumococcus, a common disease-causing organism, are resistant to streptomycin, for example. DNA taken from a resistant strain can make a sensitive strain resistant and this change is subsequently inherited, Dr. S. M. Beiser of Columbia University's College of Physicians and Surgeons, New York, explained. However, artificial DNA stops the reaction.

"By every criterion used so far," Dr. Beiser told SCIENCE SERVICE, "the synthetic DNA is the same as the natural DNA." Its synthesis, announced by Dr. Beiser and Dr. Aaron Bendich and Mr. Herbert Rosenkranz of the Sloan-Kettering Institute, was completed without using any natural DNA or enzymes to help build the living molecule as has been done in previous syntheses of DNA.

Inert molecules known as nucleotides and found in DNA were used as the starting material. The scientists believed that in the test tube the nucleotides tended to come together to form DNA-like molecules but that they separated as quickly as they came together. The problem was to prevent the separation.

By using a "substituted cellulose" called Ecteola which has a special attraction for DNA but not for the smaller nucleotides, the scientists obtained their DNA-like compound. The nucleotides were shaken in a solution of Ecteola. As the Ecteola removed the DNA-like molecules from the solution, more were formed by the nucleotides in order to restore the equilibrium or balance of the solution. Eventually the synthetic DNA molecules could be washed off the surface of the Ecteola with solvents.

In the living cell, DNA is made from nucleotides with the help of existing DNA and special enzymes.

Mr. Rosenkranz reported the research to scientists at the Fourth International Congress of Biochemistry in Vienna, Austria.

Science News Letter, September 13, 1958

ENGINEERING

A-Heat for Homes

➤ THE WORLD'S first atomic house heating installations will begin operating in a few years.

Described at the Second United Nations International Conference on the Peaceful Uses of Atomic Energy meeting in Geneva, two such installations will be located in Sweden.

Sweden is building two underground atomic reactors to be fueled by natural uranium mined within the country and to be moderated by heavy water.

One of the reactors known as R3 will heat homes in a new suburb south of Stockholm. The city of Vasteras, 70 miles west of Stockholm, will be the site of the second reactor which has been given the name "Adam." Heated water will be circulated to homes, replacing citywide oil heating systems.

The dual project, reported by two teams of Swedish scientists, will produce electricity as well as heat. They expect the reactors to generate a total electrical energy output of 200,000 kilowatts.

The two reactors will be buried in rock to minimize the danger of radioactivity in event of accidents.

Another group of scientists, representing Mitsubishi, a large Japanese industrial complex, announced plans for a nuclear-powered passenger ship for service between Japan and the east coast of South America. The ship will have a capacity of 2,000 emigrants, 200 additional passengers and 8,000 tons of cargo. Construction has not been started on the vessel which is expected to sail at a speed of 23 knots, thus halving the time of the present Japan-South America trip.

The possibility of using the energy of fission recoil fragments, through the conversion of nuclear energy to heat and also directly to chemical energy, for industrial chemical processes was reported by a group from the British Atomic Energy Authority at Harwell. Most promising, they said, are the synthesis of ammonia to hydrazine, production of nitric acid and the synthesis of hydrogen.

Science News Letter, September 13, 1958

TECHNOLOGY

Airborne Atomic Power For Isolated Posts

➤ A LOW-POWER nuclear reactor that is designed to produce atomic power and space heat at remote military stations has started work at Idaho Falls, Idaho. The new Argonne Low Power Reactor will produce 3,000 thermal kilowatts and it can be transported in Air Force cargo planes.

Operating three years on each loading of enriched uranium fuel, it is intended to provide power for radar equipment and space heat for buildings at isolated locations where conventional fuel is very expensive.

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ENGINEERING

Create Bomb-Proof House

➤ NO ONE in the United States appears to want a house that will protect him from a nuclear bomb blast, but such a house has been created anyway.

Compressible walls that roll with the punch of an atomic blast or hurricane gust comprise the main structural feature of the brick house. A design feature of the house is a group of windowless rooms in the center, each wall being heavier rather than thinner than outside walls as in the case of conventional houses.

Officials of the Structural Clay Products Institute, Washington, D. C., believe the house offers the best protection against nuclear blasts available within considerations of cost and appearances. However, their surveys have shown "no public interest at all" in such protection.

Since the public is not interested in A- and H-bomb protection, the designers are promoting the building for construction in hurricane and tornado areas. There the public seems willing to spend 5% to 20% more for the compressible brick wall or for the "inner safety core" that proved themselves in the 1957 nuclear tests in Nevada.

Staff engineer James G. Gross said the SCPI created the house "out of a sense of duty to the public." The home was designed by SCPI's research affiliate, the Structural Clay Products Research Foundation, Geneva, Ill., whose engineers submitted a brick schoolhouse to the 1957 atomic survival test.

The schoolhouse's brick walls were unharmed by the blast since an "arching" structural feature caused them to bow one-quarter of an inch and then return to their original configuration after the blast pressure was released.

Inhabitants of houses made with arched brick walls need not fear major structural damage from natural or man-made disasters —unless an A-bomb were to explode virtually on top of the house—Clarence B. Monk Jr., manager of the engineering and architectural research division, said.

However, Mr. Monk pointed out, the big danger observed last year in Nevada was the probability of being cut to slivers by flying glass. Since nobody wants to live in a windowless home, he said, SCPRF designed the inner safety core as a family retreat. The windowless, reinforced area normally would be a den or hallway.

Of the approximately 30,000 home building contractors operating today in the United States, the structural brick authorities told SCIENCE SERVICE, less than five actively promote nuclear war safety features in their homes. And these three or four, one official said, offer only such rudimentary features as bomb dug-outs or shelter basements.

However, many builders in tornado and hurricane areas are expected to offer designs based on the brick group's house. The safety core alone would add about five percent to the cost of a house. With the arching wall feature, combined costs are expected to add about 20%.

Science News Letter, September 13, 1958

CONSERVATION

Try Saving Cahow Birds

➤ CONSERVATIONISTS think they have found a way to save the last 14 Bermuda cahow birds in the world from extinction. They narrow the bird's nesting burrow with cement to keep out the bigger and more abundant longtail, a death-dealing home jumper.

The Bermuda cahow used to rule the roost in Bermuda more than 300 years ago. Hundreds of thousands of the birds swarmed around the Island during breeding season, long before man came to settle. It was man's settling that finally unsettled this small white petrel.

Between the years 1612 and 1630 Bermuda suffered a famine. The Island's colonizers thwarted starvation by living on the cahows. So great was the slaughter that the cahow was not seen on the Island again until 1906, when one was discovered by the late Dr. L. L. Mowbray.

Two other birds were found between 1906 and the Second World War, both having hit man-made obstacles. It was not until 1951, however, that nesting sites of the cahows were rediscovered by Dr. Mowbray's son, Louis S. Mowbray, director of the Government Aquarium in Flatts, Bermuda.

The cahow nests on three little islets off the coast of Bermuda. They come in from the sea in October to court and then leave again until late December, when they rearrive to nest in burrows and hatch their one egg per female. In early March the eggs hatch—there were four new young last year —and feeding goes on through early June, after which the birds fly out to sea for a four-month or so stay.

Unfortunately for these last few birds of their kind, the bigger longtail breeds during part of the same time. Unlike the cahow, the long tail is not particular where it nests, just so long as it is a burrow. Inevitably, a longtail will enter a cahow nesting burrow, attack the newly hatched cahow chick and kill it.

To thwart the longtail, conservationists such as Mr. Mowbray and David Wingate, employed to follow the birds' survival attempt, have made artificial doors for the cahow burrows. Since the cahow is smaller than the longtail, the added cement keeps the longtail out, but permits the cahow adult to come and go to feed its young.

There is even a movement afoot in Bermuda to adopt the cahow as the avian symbol for the Island.

Science News Letter, September 13, 1958

MAKING CONVERTERS—A special furnace is required to make thermoelectric materials capable of converting heat into electricity.

ENGINEERING

Heat-to-Electricity Convertors Show Promise

➤ A POTENTIALLY useful means of developing electrical energy directly from heat by the use of materials related to pottery and brick has been revealed.

Tiny electrical power generators that do not involve moving parts or require bulky storage batteries may be developed to operate guided missile and artificial satellite instruments, as a result of research on ceramic materials.

Dr. Clarence Zener, director of Westinghouse Research Laboratories, Pittsburgh, described the new flame-to-electricity conversion materials to a conference on thermoelectricity sponsored by the U. S. Naval Research Laboratory.

The materials, when heated by a flame or other high temperature source, set up on electrical current that can be harnessed for useful work.

Dr. Zener explained that the ceramic-like materials overcome disadvantages of earlier heat-to-electricity conversion techniques. They are common materials, compounds of metals such as nickel and manganese, and would put no burden on our stockpile of critical materials. They do not require ultra-high-purity refining, high-vacuum operation or complex electronic apparatus.

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● RADIO

Saturday, Sept. 20, 1958, 1:30-1:45 p.m., EDT

"Adventures in Science" with Watson Davis, director of Science Service, over the CBS Radio network. Check your local CBS station.

Capt. W. W. Wilbourne, commander of the Naval Ordnance Laboratory, Silver Spring, Md., will discuss "From Underseas to Outer Space."

BIOLOGY

Light Makes Migratory Birds Eat Faster

➤ MIGRATING birds preparing to take off on a long trip north fatten themselves before leaving.

Scientists believe it is the amount of daylight that causes their voracious eating and resulting fat deposits.

Reporting on a study of migratory birds subjected to artificial periods of daylight, a research team said that, when exposed to eight hours of daylight, the birds failed to gain weight or store fat. However, on 20 hours exposure, the birds showed a marked increase in weight with a marked increase in fat and a decrease in glycogen, another energy-giving compound important to animals.

This decrease in glycogen, the form in which carbohydrates are usually stored in the muscle tissues of animals, is very important, Dr. Fred I. Kamemoto told scientists at the American Society of Zoologists meeting in Bloomington, Ind. The State College of Washington zoologist said a migratory bird needs an increased energy supply and fat gives more energy per gram than glycogen.

In non-migratory birds, the English sparrow was studied, increased light was not followed by fat deposit. Glycogen even increased slightly.

Dr. Kamemoto and his associates believe that the presence or absence of light affects the pancreas, which secretes insulin. Insulin, in turn, is related to blood glucose and influences the presence of this energy "food" in the body.

So far migrating birds have not been studied in the fall. Andreas Oksche, Harold E. Cheyney Jr., and Donald S. Farner of State College of Washington and University of Marburg/Lahn, Germany, also worked on the project, which was supported in part by a National Science Foundation grant.

Science News Letter, September 13, 1958

ENGINEERING

Future Wars to Be Fought By Small Armored Teams

➤ WARS of the future may be fought by small widely dispersed teams of mobile armor bearing conventional weapons.

They will be under the constant threat of nuclear destruction, although the chance is that neither side would be willing to make the move that could bring on a general atomic holocaust.

In the *Military Review* (Sept.), published by the U. S. Army Command and General Staff College, Fort Leavenworth, Kans., Richard M. Ogorkiewicz furthermore warns that the gasoline engines of armored units should be replaced by the more economical diesel motors. Diesels use less bulk of fuel, thus easing the problem of supplying mobile units.

Mr. Ogorkiewicz, a mechanical engineer with the automotive manufacturing Rootes Group of London, believes the possession of nuclear weapons by the United States, Russia, Great Britain, and, perhaps in the future, other countries has destroyed the classical military tactic of massing troops for large scale breakthroughs.

"In this situation," he says, "armored forces should consist of hard-hitting, small, mobile groups composed of heavy self-propelled weapons, tanks, and infantry in armored carriers . . . Their primary aim would be to combat aggressor forces directly with skillful, mobile tactics and superior equipment and thus check aggression on the spot and in a nonsuicidal way."

By "nonsuicidal" Mr. Ogorkiewicz was referring to small tactical nuclear weapons. To use them, he believes, could lead to widespread and useless destruction. He describes a possible nuclear wartime situation in the following way:

"As both sides would ultimately possess them (tactical nuclear weapons), their employment would lead to the impossible situation of small, widely dispersed units stalking each other with over-powered weapons and pulverizing the country around them in the process. Thus even if the tactical employment of nuclear weapons did not start a disastrous all-out nuclear war, it would, in populated districts, kill off the population which ostensibly was being defended."

Science News Letter, September 13, 1958

PSYCHOLOGY

Institution Babies Get Less Care, Not Different

➤ INSTITUTION babies receive the same kinds of care as babies in their own home; it is the amount of care that differs.

Dr. Harriet L. Rheingold of the National Institute of Mental Health has devised a scale for measuring infant care. Using it, she compared the care given 3-month-old first-born babies in better than average homes with that given in a "good institution." Observations were made every 15 seconds during a period of eight hours.

Both the institution baby and the home baby are much more often held, fed, talked to and looked at than they are diapered, bathed, played with or rocked. But the mother spends much more time looking at the face of her baby, talking to him and holding him in her arms than does the busy nurse in an institution.

Home babies received some kind of care on 37% of the observations. Institution babies received care on only 8%. The home baby was cared for 4.5 times as often as the institution baby.

There was no activity performed by a mother in the home that was not performed, however infrequently, in the institution.

The home infant received almost all his care from his mother alone. In the institution, a baby received his care from six different nurses.

The home baby plays more with toys. The institution baby plays just as much, however. In the absence of playthings, he plays with his own hands or clothing.

Dr. Rheingold reported her research to the American Psychological Association meeting in Washington.

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IN SCIENCE

PSYCHOLOGY

Snow, Fog or Sky May Cause Blank-Out of Vision

➤ TRAVELERS in Arctic snow on an overcast day, in fog, or under an unbroken sky may suffer a temporary loss of vision. This is not a blackout but might be called a white-out or blank-out.

The peculiar effect was reported to the American Psychological Association meeting in Washington by Drs. Walter Cohen and Thomas C. Cadwallader of the University of Buffalo.

They produced the effect experimentally in the laboratory by having individuals look into a milk glass sphere. Seven out of 13 blanked out, the condition often lasting for 30 seconds or more. The blank-out was found to be accompanied by bursts of brain waves of the type known to scientists as alpha waves.

The experience does not resemble being in darkness. The individuals reported it was as if they had "stopped seeing." Although they experienced neither black nor white it was as though they were surrounded by light that had no outside source.

Most individuals seemed to feel drowsy, yawned a lot and their voices took on a hesitant, drawling quality. They could get rid of the blank-out by considerable eye movement and an attitude of search or by blinking.

The experience of drowsiness as well as the presence of slow brain waves usually associated with sleep would seem to indicate that areas of the brain other than those simply associated with vision are important for the "blank-out" effect.

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ASTRONAUTICS

Navigation Between Planets Possible

➤ ROCKET scientists are already working out systems for interplanetary navigation.

Dr. E. V. Stearns of the Lockheed Aircraft Corporation's missile system division, Palo Alto, Calif., told the Congress of the International Astronautical Federation meeting in Amsterdam that instruments depending primarily on gyroscopic stabilization will not have sufficient accuracy for long term flights and that integrating accelerometer systems are troubled by the non-linear character of the problem.

A journey from the earth to Venus was projected in the study.

A solar-planetary triangulation system has been worked out by Dr. Stearns. In this, the thrust orientation is monitored by an accelerometer-computer system and the course-to-go is determined from a steering command computer.

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CE FIELDS

PHYSICS

A-Reactor Knowledge Wanted, Not Kilowatts

➤ THE UNITED States is more interested in trying out different types of atomic power reactors for the gain of scientific information than it is in rapidly putting large reactors into operation as part of a kilowatt race with other nations.

Besides, a power reactor authority cautioned, at the present time the choice of reactors "must be made on the basis of incomplete technical data and fragmentary operating experience."

Dr. Norman Hilberry, director of the Atomic Energy Commission's Argonne National Laboratory, Lemont, Ill., pointed out that there is no economic excuse in the United States for building large numbers of nuclear power plants whose costs for the energy produced are in excess of the cost of plants using fossils fuels."

He spoke before a session of the Second United Nations International Conference on Peaceful Uses of Atomic Energy ("Atoms for Peace" conference) in Geneva, Switzerland.

Dr. Hilberry predicted that 15 to 20 years from now America's power producers will have to generate four times today's electrical energy output.

"Long before the reserve of fossils fuels begins to be exhausted, problems of rates of production and transportation will make the use of nuclear fuels essential if the United States is to maintain its rate of expansion of electrical energy."

The actual time by which the U.S. will absolutely have to begin using nuclear fuels is not yet clear, Dr. Hilberry said.

In the meantime, he stressed, we still have a few years in which to conduct research toward finding the best types of reactors. We are not yet hard-pressed to put early designs into production, he said.

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MEDICINE

Radioactive Strontium-90 Does Not Leave Bones

➤ RADIOACTIVE strontium-90, the deadly bone-hugging chemical formed by atomic- and hydrogen-bomb explosions, is virtually "impossible" to remove from the bones of live humans once it has lodged there.

Strontium-90 is one of the most long-lived products of atomic fission, any given amount taking 28 years to be reduced by half. It is a bone-seeker, like calcium and radium.

Fifteen persons with radium in their bodies were studied by scientists from the Atomic Energy Commission's Argonne National Laboratory. They found the "main structural change in human bone containing radium was the plugging of the blood-carrying canals."

Robert E. Rowland reported these results of studies by him and his associates in an account prepared for delivery at the Second United Nations International Conference on the Peaceful Uses of Atomic Energy meeting in Geneva.

The plugging of blood-carrying canals is believed to cause the death of small portions of bone, which must have a continual blood supply to live. Dead bone is usually removed naturally in the course of time. In cases of persons with radium in their bones, however, lifeless bone tended to remain in the body in the 15 cases studied.

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BIOLOGY

Spores May Be Universe's Original Space Travelers

➤ SPORES MAY be the first living things to survive a trip through outer space.

Or they may be already floating around, the original space travelers.

It is now known definitely that they can live in the virtually airless atmosphere found high above the earth.

For the first time spores of common everyday bacteria and fungi have been subjected to a vacuum equivalent to what a space traveler would find 100 miles above the earth and have survived "without evident impairment of growth."

In a report that was cleared, hand-carried and rushed to the American Institute of Biological Sciences meeting in Bloomington, Ind., Dr. Alton E. Prince of Wright-Patterson Air Development Center's materials laboratory, Dayton, Ohio, described his recently completed research. Analysis of results is still not complete, Dr. Prince told SCIENCE SERVICE, but the spores lived through 32 days of exposure to a laboratory facsimile of the air a space traveler and space ship would encounter. Beyond 100 miles, he said the density of the atmosphere does not vary greatly.

The spores, including the fungi, *Aspergillus niger* and *Aspergillus flavus,* and the bacteria, *Bacterium globigii* and *Bacterium mycoides,* were kept in a special space chamber developed for Wright-Patterson by the Litton Industries, Inc., of Beverly Hills, Calif.

Temperatures and other environmental conditions were normal and the spores showed no evidence of damage. There was no reduction in germination, no change in color, etc. Further research is planned to see if the effects of temperature extremes together with life in a near vacuum may harm the spores.

A last minute rescheduling of reports and scientific discussions was necessary to give scientists attending the meeting a chance to hear of these first results. Dr. Prince's research was believed to be so "red hot" that Dr. C. L. Porter of Purdue University, president of the Society for Industrial Microbiology, arranged for its immediate presentation to the society.

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GENETICS

Cell Changes Set Human Life Span

➤ A NEW MEASURE of the spontaneous changes in heredity in man, the "somatic mutations" or the variations in the living cells, was presented to the International Genetics Congress in Montreal by Dr. G. Failla of Columbia University's Radiological Research Laboratory, New York.

The measure can be derived from the mortality rate.

Studying mice, rats, fruit flies and men, Dr. Failla found that the spontaneous mutation rate for each per cell per year is very closely the same, if it is assumed that aging is due to somatic mutations.

The increase in mortality rate with advancing age is due primarily to the accumulation of somatic mutations, Dr. Failla suggested, and if this is so the lifespan is set by the inherent stability of the genetic system of the species.

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ENGINEERING

Revolutionary Propeller Increases Ship Speeds

See Front Cover

➤ THE UNITED STATES Navy has announced the development of a revolutionary ship propeller that it compares in importance to the development of jet propulsion for aircraft.

The propeller gets its kick from the same obstacle that severely limits the speeds attainable with craft driven by conventional propellers.

Development of the propeller is the direct result of work in the field of hydrofoils by Marshall P. Tulin, currently serving with the Office of Naval Research Branch Office in London. Hydrofoil cross-sections used in the propeller design make possible for the first time high-speed propulsion through the water at high efficiencies.

The photograph on the cover of this week's SCIENCE NEWS LETTER shows the "super-cavitating" propeller in action. It resembles the screw-like part of an ordinary kitchen food grinder. The two flanges of the propeller have squared ends rather than the tapered ends of the conventional propeller blade.

Heretofore, cavitation, the formation of a vacuum around speeding propellers, has been a barrier to increasing speeds. The vacuum, actually a vapor pocket, becomes so large that it seriously limits the propeller efficiency. When the pocket becomes greater than the width of the propeller, a condition of super-cavitation exists.

The new propeller provides a means of capitalizing on super-cavitation as a means of increasing the speed of ships.

The recent development of high-speed marine gas turbines appears to be ideally suited to the new design of propeller, the Navy said.

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FOOD TECHNOLOGY

Tomorrow's Dinner

Microorganisms, such as yeast, for producing protein are promising sources of food for humans. One-celled plants that grow on ponds are also promising.

By JOHN E. DESPAUL
Assistant Chief
U. S. Military Food Subsistence Laboratory

➤ WHERE IS tomorrow's dinner coming from? That is the question scientists are already asking. Birth rates are shooting up. Usable farm land is decreasing. What are we going to do for food when we run out of land to feed more millions of hungry mouths?

Scientists say that the problem of sufficient food for future generations requires some drastic action right now. The world's population has doubled since 1800. In the United States alone, it is estimated that there will be 35,000,000 more people by 1975. With these extra people there will be more homes built, more schools, more churches. There also will be more highways, parking lots, drive-in theaters, and industrial buildings. All of these structures and many more will cover up ground that once was used for raising food. Not only will there be more and more people to eat the food of the future, but there will be less and less land on which to raise it.

Only a partial solution of the problem is to be gained by draining swamps and turning them into crop-raising fields. Complete use of all desert areas and tilling slopes and peaks of mountains can add only a limited amount of arable land. In the face of ever-increasing population curves, scientists are looking to the sea and lower forms of life for an answer to food shortages in the future.

Cheap Energy

Microorganisms have a high degree of efficiency in using energy. They can get this energy from cheap carbohydrates. Now these are discarded in the form of sewage, wastes from sugar mills, sawdust from lumber mills, corncobs, old newspapers, and similar waste in a thousand other forms, Scientists say that microorganisms can convert these wastes into food. Microorganisms can make sugars, fats, starches and proteins from these wastes. They can do it more efficiently than the farmer can raise crops on his land. For example, microorganisms can convert the produce from one acre of farm land into ten times as much protein as could be produced by raising cattle on the land.

Actually, the production of fats by microbes is not a new thing. The Germans undertook this during World War I in order to relieve severe shortages in the diet. Yields of more than 64% fat were obtained by using certain microorganisms. A yield of 50% is a good average. This is about as much fat as nuts contain. It is more fat than corn or cottonseed or soybeans contain, although these are commercially pressed or extracted for cooking oils.

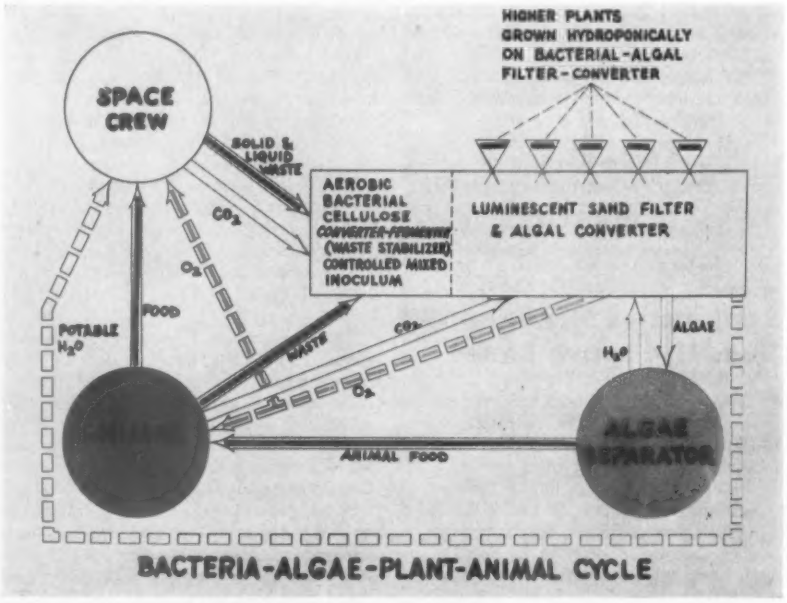
Although the proteins of most microorganisms are deficient in some amino acids, scientists are relying on using them to feed future generations. Bacteria, for example, could be a valuable source of a high protein food. Intensive research in this direction has been started at the Mississippi Agriculture Experiment Station, State College, by Dr. Lois Almon and her associates. So far, taste panels agree that baking powder biscuits made with two percent dead bodies of bacteria taste just as good as biscuits made from ordinary flour. The bacteria contribute 12 important amino acids to the diet.

Yeast may be even more important as a food of future generations. In pointing out the significance of yeast as a food at the Pasteur Fermentation Centennial in New York, Dr. Marvin J. Johnson, University of Wisconsin, Madison, prophesied that yeast's future is sound. Today, Dr. Johnson said, yeast is used both in baking and in animal foods. Humans have been reluctant to accept yeast as a major food item. But increasing world population may force the use of yeast. It may be particularly important in tropical countries. There are many carbohydrate sources in such areas, Dr. Johnson explained, but little protein. Yeast could be a major source of protein in the diet of these countries.

The most amazing thing about yeast is the rate at which it can produce food. A 1,000-pound-steer can produce about one pound of beef in 24 hours, but the same weight of yeast can produce 100,000 pounds of high-grade protein in the same time! This is why yeast is so interesting to scientists.

The first all-out effort to manufacture yeast on a large scale for food was made in Germany during World War II. A special kind of yeast called *Torulopsis utilis* was used to convert sawdust to food. Germany produced 16,500 tons of food per year this way. It was a great aid to them in extending their food supplies during the war years. Germany felt that yeast was such an important source of food that more than one dozen yeast factories were in various stages of construction and operation at the close of the war.

The United States has also been vitally interested in yeast as a food. A yeast plant has been in continuous operation since 1948 in Rhinelander, Wis. It produces more than 12,000 pounds of food per day. About 20% of this is being used for human food. The rest goes into feed for animals and poultry.



FOOD FACTORY—This complicated diagram may be the blueprint for tomorrow's dinner. It is one of the schemes scientists are now working on at the U. S. Armed Forces' Quartermaster Food and Container Institute for finding unique food production processes to feed future generations.

If you like soup or sausage, you may be eating some of the yeast produced in Rhinelander.

In India, several tons of U. S.-produced torula yeast have been subjected to nutritional trials. The Chinese Nationalists have constructed a large torula yeast factory in Formosa with the aid of U. S. technicians. They are expecting to produce 800,000 pounds of food per day. Plants have also been set up in South Africa, Jamaica, Switzerland, France, Sweden, and Hawaii.

Scientists stress that the role of yeast in the diet is that of a supplement. Ample evidence is available to show that yeast, added to diets deficient in essential amino acids, is highly beneficial to both man and animals. In future generations, as the shortage of animal protein is felt more, yeast is expected to assume tremendous importance in the diet. It will be a big asset in furnishing food for the future.

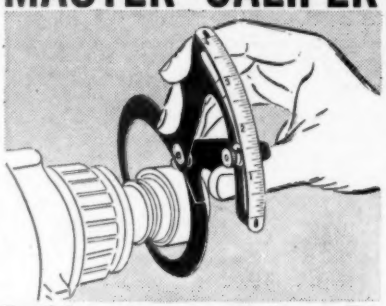
Food from the Sea

Research is being conducted not only on land sources of food, but in the sea as well. The oceans cover approximately 80% of the earth's surface. Scientists picture them as one vast hydroponic farm. Gilbert B. Levin of Resources Research, Inc., startled delegates to the International Symposium on Saline Water, recently held in Washington, D. C., with the idea that both food and water for future generations can come from algae which can grow in salt water. Here's how it would be done: Algae of a certain type take up large quantities of salt when the sun shines on them. When the sunlight is stopped, the algae lose the salt. Mr. Levin envisions the use of the algae to desalt seawater for drinking purposes. Later the algae would themselves be desalted to provide food.

The yield of food produced by algae is fantastic. Take the algae that grows on the surface of ponds, for example. It is a little one-celled plant that depends on the magic of sunlight for its growth. It is called Chlorella. Chlorella can produce more than 15 times as much food per acre as soybeans, one of our major farm crops. A large share of this food is protein, about 15 tons of it. And two or more tons of fat are produced per acre at the same time. This is more than double the total weight of soybeans that a farmer could expect to get from the same amount of land.

There is no question in the minds of scientists but what the farms of the future will actually be factories. Farms, as we know them today, will be used to produce carbohydrates. The carbohydrates will in large part serve as an energy food for yeasts, one-celled plants, and microorganisms. These simple forms of life will be housed in food factories. Here they will use the energy of carbohydrates to combine nitrogen of the air with carbon dioxide to form protein food. They will take up minerals that come from the sea and from the land, and change these into nourishment for man and animals, both. They will make edible fats and sugars and starches from by-products and waste that are now being thrown away.

MASTER CALIPER ...with 0 to 4 inch large, direct reading scale and one hand spring operation



Few Calipers can compare with this one. This handy tool quickly becomes indispensable to machinists, model makers, inspectors, draftsmen, hobbyists and home craftsmen.

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• Books of the Week •

For the editorial information of our readers, books received for review since last week's issue are listed. For convenient purchase of any U. S. book in print, send a remittance to cover retail price (postage will be paid) to Book Department, Science Service, 1719 N Street, N.W., Washington 6, D. C. Request free publications direct from publisher, not from Science Service.

THE ACADEMIC TEACHING BACKGROUNDS OF SECONDARY SCIENCE TEACHERS IN THE STATE OF OHIO—Charles L. Koelsche—*Research Foundation, Univ. of Toledo*, 53 p., paper, single copies free upon request direct to publisher, Toledo 6, Ohio. Investigates the present status of science education in Ohio schools.

AKU-AKU: The Secret of Easter Island—Thor Heyerdahl—*Rand McNally*, 384 p., illus., $6.95. Exploring the statues and secret caves of Easter Island.

ARTIFICIAL SATELLITES (Translation) — A. Shternfel'd—*State Pub. House of Technical-Theoretical Lit., Moscow, (Office of Technical Services)*, 2nd rev. ed., 424 p., illus., paper, $6. Author won the International Prize for the Promotion of Astronautics.

THE GENETIC BASIS OF SELECTION—I. Michael Lerner—*Wiley*, 298 p., graphs, $8. Discusses the quantitative aspects of selection in breeding practice and evolution without emphasis on statistical treatment.

GEOPHYSICS AND THE IGY: Proceedings of the Symposium at the Opening of the International Geophysical Year—Hugh Odishaw and Stanley Ruttenberg, Eds.—*Am. Geophysical Union*, 210 p., illus., $8. Contains reports on the early results of the IGY.

THE HANDBOOK OF ROCKETS AND GUIDED MISSILES — Norman J. Bowman — *Perastadion Press*, 328 p., illus., $6.50. Compilation of data on rockets and missiles, both modern and historical, arranged alphabetically.

AN INEXPENSIVE SCIENCE LIBRARY: A Selected List of Paperbound Science Books—Hilary J. Deason, compiler—*Am. Ass'n for the Advancement of Science*, 2nd ed., 38 p., paper, 25¢. Lists re-issues of classics, reprints of outstanding contemporary books and new books, grouped by subject matter.

INSIDE THE ATOM—Isaac Asimov—*Abelard-Schuman*, rev. ed., 185 p., illus., $2.75. Tells what goes on inside the atom, how man has learned about it and what he has done with his knowledge.

INTRODUCTION TO THE PLANT KINGDOM—Norman H. Russell—*Mosby*, 353 p., illus., $5.50. A one-semester elementary botany course.

LIVING RESOURCES OF THE SEA: Opportunities for Research and Expansion—Lionel A. Walford—*Conservation Foundation (Ronald)*, 321 p., illus., $6. While replete with information on marine resources, emphasis is on what still remains to be learned about life within the most extensive element of our earth.

LOOKING AT THE STARS—Michael Ovenden—*Philosophical Lib.*, 192 p., photographs and diagrams, $4.75. One of the Excursions Series of books on leisure-time activities, this one introduces readers to the pleasures of astronomy.

THE PRINCIPLES OF SCIENCE: A Treatise on Logic and Scientific Method—W. Stanley Jevons, introd. by Ernest Nagel—*Dover*, 786 p., paper, $2.98. First published in 1873.

THE PROBLEMS OF WORLD POPULATION: The Rede Lecture 1958—Sir Charles Darwin—*Cambridge Univ. Press*, 42 p., paper, 75¢. Long-range and short-range forecast by British theoretical physicist.

ROSES—F. Fairbrother—*Penguin*, 180 p., illus., paper, 95¢. Practical manual for all who would like to grow roses, prepared in conjunction with the Royal Horticultural Society.

SOVIET ABSTRACTS: Biology—U.S. Joint Publications Res. Service—*Office of Technical Services*, paper, $1. Translations of entries in the Soviet Biology Abstracts Journal, No. 3, 1958.

SOVIET ABSTRACTS: Physics—U.S. Joint Publications Res. Service—*Office of Technical Services*, paper, 75¢. Complete translations of entries in the Soviet Physics Abstracts Journal No. 1, 1958.

THE THEORY OF EVOLUTION — J. Maynard Smith—*Penguin*, 320 p., illus., paper, 85¢. Describes how Darwin's theory has been confirmed, but at the same time transformed, by recent research.

THE TRAVELING HIGH SCHOOL SCIENCE LIBRARY—Hilary J. Deason—*Am. Assn. for the Advancement of Science*, 4th ed., 68 p., paper, 25¢. Designed to broaden the science background of high school students. Valuable guide to librarians.

WONDERS OF THE ANTARCTIC—Jacqueline Berrill—*Dodd*, 96 p., illus. with drawings by author, $2.95. Describes penguins, seals, albatrosses and other inhabitants of Antarctica and the oceans surrounding it.

YOUR CAREER IN ELECTRONICS — 1959 — J. Heiges and others—*Popular Electronics*, 132 p., illus., paper, $1. Short survey of the field, aptitude test, and guide to schools and colleges.

Science News Letter, September 13, 1958

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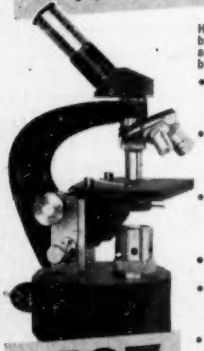

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The Annual National Science Fair (started in 1950) is held each spring in a different city. The NSF has been to Philadelphia, Pa., St. Louis, Mo., Washington, D. C., Oak Ridge, Tenn., Lafayette, Ind., Cleveland, Ohio, Oklahoma City, Okla., Los Angeles, Calif., and Flint, Mich. The boys and girls who show the best science exhibits in cooperating local science fairs get three-day all-expenses-paid trips to the National Science Fair, and a chance to compete there for honors and awards. Only sophomores, juniors and seniors in high school are eligible to go to the NSF but in most local science fairs boys and girls of all ages can compete for local honors. The host city for the NSF in 1959 is Hartford, Conn. In 1960 it is scheduled for Indianapolis, Ind.

The Annual National Science Talent Search (started in 1942) is held each year for seniors in high school who want to compete for $34,250 in Westinghouse Science Scholarships and Awards for their college education. Annually an Honor Group is selected. Of these, 40 boys and girls, chosen as winners, also receive a five-day all-expenses-paid trip to Washington, D. C., to attend the Science Talent Institute. The 18th Science Talent Institute will be held in 1959. Experience in science clubs and participation in science fairs is great practice for those who are planning to compete in the STS when they are old enough.

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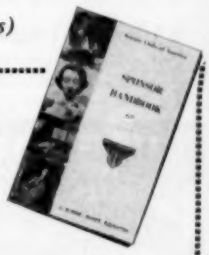

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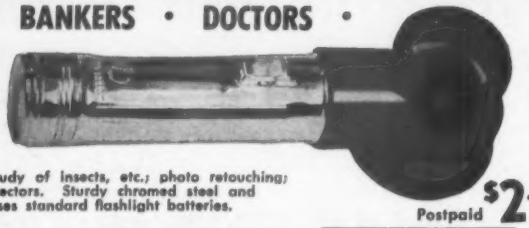

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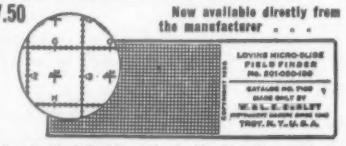

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ENGINEERING—Where will the world's first atomic-energy heated houses be located? p. 166.

Photographs: Cover, U.S. Navy; p. 163, University of Wisconsin; p. 165, Los Alamos Scientific Laboratory; p. 167, Westinghouse Research Laboratories; p. 170, John E. Despaul; p. 176, W. R. Grace & Co., Polymer Chemicals Division.

ENGINEERING

Predict Use of H-Bombs For Electricity and Mining

➤ GIGANTIC underground hydrogen-bomb explosions will produce electricity before the fusion process can be harnessed, Dr. Edward Teller of the University of California's Radiation Laboratory predicted.

Addressing the Conference on Peaceful Uses of Atomic Energy, Dr. Teller said that controlled hydrogen fusion is economically improbable before the year 2000.

But, he said, it is probable that at a much earlier time the tremendous energy of H-bombs exploded deep in the earth could convert rock water into high-pressure steam useful for the generation of electricity. The bomb also could be used to move earth for the building of harbors and canals, to change the distribution of water of rivers and lakes, and to bare minerals for mining.

Hydrogen fusion processes operate with low radioactive contamination levels and at low cost due to the cheapness of deuterium, a fuel of fusion.

One way by which fusion power could be obtained is the direct production of electricity from a hot plasma of heavy hydrogen, deuterium, interacting with magnetic fields which would eliminate heat exchangers and many moving parts of the generating apparatus and make the future of thermonuclear reactors attractive.

When achieved, controlled thermonuclear power will dominate human planning for the far future.

Science News Letter, September 13, 1958

Do You Know?

During a period of years, even a minute daily increase in caloric intake, combined with the normal decrease in physical energy and the body's metabolic demands, can result in a marked *weight gain.*

An 80-year-old theory that the circular motion of the earth's axis causes small *ocean tides* has been confirmed by high-speed computers.

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• New Machines and Gadgets •

For sources of more information on new things described, send a self-addressed stamped envelope to SCIENCE NEWS LETTER, 1719 N St., N.W., Washington 6, D. C., and ask for Gadget Bulletin 952. To receive this Gadget Bulletin without special request each week, remit $1.50 for one year's subscription.

ELECTRIC FENCE FASTENER is said to enable wire to be slipped on, eliminating the effort of threading. The fastener is molded in one piece from a butyrate plastic. It can be nailed or screwed to a fence post and is a good insulator.

Science News Letter, September 13, 1958

OFFSET HANDLE for a frozen food knife is designed to make cutting easier. Molded of a phenolic plastic, the handle has a recess in the topside and a curve on the underside. The knife is said to be safer than straight-handled knives.

Science News Letter, September 13, 1958

GAS FUEL BUILT-IN BARBECUE uses random pieces of ceramic material placed over the cast iron grate to hold and distribute heat from a 25,000 BTU burner. The burner chamber is surrounded by a one-inch thick layer of insulating firebrick. The unit is fed with a ¾-inch gas supply line.

Science News Letter, September 13, 1958

HOOP TOY made of plastic measures 36-inches in diameter. It is said that with a little practice the hoop's user can learn to spin it around the waist, neck or knees. The hoop shown in the photograph also floats

and can be used for water games, as well as for hoop rolling and giant horseshoes.

Science News Letter, September 13, 1958

LIGHTWEIGHT DRILL can be used for metal drilling or fast-drilling wood. The ⅜-inch drill is described as particularly useful for working with carbide-tipped bits in stone, tile and concrete. It measures nine inches; weighs three and three-quarters pounds; and has a pistol-grip handle.

Science News Letter, September 13, 1958

LABORATORY FURNITURE has four drawers for apparatus storage and is sitting height for instrument work. The unit is a little over 26 inches wide, 30 inches deep and 38 inches to the top of its reagent shelf. Its body is made of 18-gauge welded steel.

Science News Letter, September 13, 1958

LAWN SPRINKLER has an internal spiral design and cap which produce a fine spray. Made of a butyrate plastic, the sprinkler will not rust or corrode. It has no moving parts.

Science News Letter, September 13, 1958

ADHESIVE STRIP is designed for use in the home, office or workshop. Both front and back have a non-drying, non-staining adhesive. The back is pressed onto a wall or board. The front holds memos, coins, pencils and small tools. It can be reused.

Science News Letter, September 13, 1958

Nature Ramblings

By HORACE LOFTIN

➤ IT TOOK a sputnik to do it, but today's adults are beginning to see the wisdom of more science for tomorrow's adults. Further, they realize that youngsters with a natural aptitude for science should be given the change to make the most of their talent as early as possible.

To this end, educators and psychologists are attempting to find out just who these especially talented youths are among the great number of school-age children.

One ready-made aptitude test is the urge to collect.

Does the eight-year-old boy have a hoard of rocks in a carefully guarded cigar box? A potential nuclear physicist. Does he have a private menagerie of frogs, spiders, snakes and caterpillars on the back porch? A budding chemist. Does he have a book of foreign stamps, Indian-head pennies, a rack of

Aptitude Test

carefully pinned insects? A biologist or mathematician.

The titles listed above are just by way of suggestion. The important thing is that the student collects—almost any old thing! There is no correlation between the thing collected and the future scientist's field of study.

It can be argued that every boy goes through this stage of hoarding rocks, bugs, snakes, match covers, ad infinitum. That is the point. All children are curious about the world around them. They are avid to learn. They want to possess these objects to satisfy their curiosity and in a sense to control something of this big, strange world.

To this degree, scientists are overgrown boys. They have retained their boyish wonder and by collecting ideas and observations they are satisfying that curiosity and are learning to live with nature.

What child is not a potential scientist? Give him the opportunity to ramble in the world of nature, teach him to have an observant eye and a questioning mind, and the desire to collect stones can become a thirst for collecting facts.

A scientist is a person with an inquiring mind, not necessarily a person with a certain number of degrees who works on a college campus. The world is his laboratory, and the green woods, the lake, the seashore, and plants and animals are his first teachers.

A love for these things is one of the best aptitude tests.

Science News Letter, September 13, 1958